QUEUE

INTELLECTUAL SOFTWARE

DECIMAL AND PERCENT WORD PROBLEMS

Queue, 5 Chapel Hill Drive, Fairfield, CT 06432

DECIMAL AND PERCENT WORD PROBLEMS

DECIMAL AND PERCENT WORD PROBLEMS

Decimal and Percent Word Problems

Table of Contents

Introduction..... 4

Educational Objectives..... 5

Program Contents..... 5

Operating Instructions..... 6

Sample Items (from Decimal Word Problems)..... 9

Sample Items (from Percent Word Problems)..... 10

Suggestions for Use..... 13

Decimal Word Problems Practice Worksheet..... 14

Percent Word Problems Worksheets..... 18
- Conversion of Percents and Decimal Values Worksheet
- Practice Worksheet

Supplemental Exercises Answer Key..... 24

Management System Instructions..... 25

Support..... 28

© 1986 Queue, Inc.

Introduction

The **Decimal and Percent Word Problems** series is designed to teach students in grades 6 through 8 a step-by-step approach to solve word problems based on decimals and percentages. Older students will also find the series valuable for remediation. There are two disks in the series, one covering decimal problems and the other, percentages.

The first disk, **Decimal Word Problems** , contains six lesson modules covering addition, subtraction, multiplication, and division problems, as well as problems requiring multiple operations. The word problems in this program range in difficulty from money problems requiring simple addition to more complex problems requiring several operations, as in this example: "Sarah babysat for 6 hours at $1.25 an hour. She babysat 4 more hours for $1.35 an hour. How much more did she earn during the 6 hour job than the 4 hour job?"

Percent Word Problems , the second disk, provides practice in addition, subtraction, multiplication, and division using percents. This half of the program also helps students to convert percentages into numbers using decimals.

The program consists of four lesson modules, and the lessons progress from the simple to the more complex types of word problems. The first two lessons cover relatively simple problems requiring only one operation, such as "What is 40% of 925?" and "Mr. Bronski invested a principal of $1375.00 at a rate of 9%. How much interest did he earn?" The last two lessons move on to more complex problems involving several operations, such as: "A winter coat which cost $150.00 was discounted 15% at the end of the season. What does it cost now?"

Decimal and Percent Word Problems provides immediate feedback, positive reinforcement and non-punishing remediation in the form of hints and explanations. Musical tones and highlighting signal important concepts in the lessons. Students are never told that they are "wrong" or that their answers are "incorrect." Throughout, the emphasis is on success. The program facilitates learning through a variety of question and answer formats which are easy to understand. This software is designed to be used independently, and provides for student self-evaluation through scoring.

If the student enters a correct response, the program repeats the answer showing all of the steps that were necessary to reach that solution. If an incorrect answer is entered, the program automatically converts percentages into decimal values and gives the student a hint, often in the form of a partial solution to the problem. The program then offers the student a second chance at the correct answer. If the second response is incorrect, the program displays the correct answer and moves on to the next problem.

In some of the lessons, the program lets the student try again and again at the correct response. This question format allows the student to discover his or her errors through repetition.

Students can exit from a lesson at any time. In Apple programs with management systems, the student's place in the lesson is saved automatically so that he or she can resume the lesson from that point the next time the program is used. At the end of each lesson, the student is told how many questions were attempted, how many were answered correctly, and how many were answered incorrectly. If your program disks have the optional management system, a record of these scores can be saved for up to ten students at a time.

Educational Objectives

The purpose of **Decimal and Percent Word Problems** is to help students:

- To learn how to analyze and solve word problems based on decimals and percents in a logical, step-by-step process
- To work with one or more arithmetical operations in order to reach a final answer
- To convert percentages into decimal values and vice versa
- To strengthen skills in addition, subtraction, multiplication, and division of whole numbers and percentages

Program Contents

The **Decimal and Percent Word Problems** series is organized into two disks, one for **Decimal Word Problems** and one for **Percent Word Problems**. Each disk has either four or six lesson modules, and there are two lessons for each topic: a tutorial lesson and a practice lesson. Tutorial lessons do the first step of the problem by displaying the required equation below the word problem. The computer highlights each important part of the word problem and then displays the appropriate sign or number below. Practice lessons require the student to do all of the steps of the problem. Some of the lessons only require one mathematical operation to reach the final answer, while others require several calculations.

Decimal Word Problems contains six lesson modules, two for each topic. The three topics covered on this disk are Addition & Subtraction, Multiplication & Division, and Multiple Operations. Below is the Main Menu as it appears at the beginning of this program.

Number	Name
1	ADDITION & SUBTRACTION I
2	ADDITION & SUBTRACTION II
3	MULTIPLICATION & DIVISION I
4	MULTIPLICATION & DIVISION II
5	MULTIPLE OPERATIONS I
6	MULTIPLE OPERATIONS II

Percent Word Problems contains four lessons, two for each topic. The two topics covered on this disk are Single Operations (only one mathematical operation is required to reach the final answer) and Multiple Operations (several calculations are required). Below is the Main Menu as it appears at the beginning of this program.

Number	Name
1	SINGLE OPERATIONS I
2	SINGLE OPERATIONS II
3	MULTIPLE OPERATIONS I
4	MULTIPLE OPERATIONS II

Operating Instructions

STARTING THE PROGRAM

1. Insert the disk into the disk drive, and turn on the computer and monitor. If you are using an Apple IIe or IIc, make sure the CAPS LOCK key is down while the program is in use.

2. After the second of two title screens, press any key to continue when the small square □ appears.

3. When prompted, type in your name. If you make a mistake, backspace with the left arrow key and retype to correct your error. Press RETURN to continue.

4. If your program has a management system, it will ask: "Is this the first time you have used this disk: (Y/N)?" Press "Y" for Yes, and the program will automatically display the menu screen.

5. If you have used this disk before and answered with an "N" for No in the previous question, the system may ask you again for your name because the one you entered cannot be found on the disk. The computer will say, "You must type your name exactly as when we first met." Press any key, and enter your name again. Make sure the CAPS LOCK key is down.

6. The menu of lesson modules available on this disk should now appear. Type in the number of the lesson you want, and press RETURN to start the lesson.

RUNNING A LESSON

- To continue from one question or screen to the next, press any key whenever the small square □ appears.

- When tutorial reading passages are displayed, musical tones may signal the presentation of important concepts.

ENTERING ANSWERS

1. A row of question marks indicates where you are to enter a response. One question mark appears for each character in the answer, including a decimal point when needed. The cursor will appear under the first question mark on the left.

2. If necessary, use paper and pencil to work out the answer. Then enter the final answer from left to right.

3. Press the Space Bar whenever a space should appear between two question marks.

4. Enter a period (.) to indicate a decimal point, and a comma when needed in a number greater than 999 (ex., 34,000). To indicate a whole number in your answer, type in zeros (0) to the right of the decimal point when necessary. The program will not accept a response if any of the question marks are left unreplaced by digits, periods, commas, or spaces.

5. To make corrections, use the left arrow key (<--) to backspace, and retype to correct your error **before** pressing RETURN to record your answer.

6. Press RETURN after completing the answer to record your response.

EXPLANATORY FEEDBACK

- After a correct answer, the program will reinforce your response, usually by repeating it in a different context along with an explanation.

- If you enter an incorrect answer the first time, the program will display a hint at the bottom of the screen showing the correct equation that is necessary to solve the problem, and you will be prompted to try again. If you answer incorrectly the second time, the program will display the correct answer along with a complete explanation, and the next problem in that lesson will appear.

- In some of the lessons, the computer will allow you to try as many times as necessary to enter the correct answer to a problem. If you find it impossible to answer a question, press the ESCAPE key (ESC) to work on the corresponding tutorial lesson, start that lesson over again, or quit altogether.

ENDING A LESSON

- To exit from a lesson without finishing, press the ESCAPE key (ESC) instead of entering an answer. ESCAPE will not work if it is pressed when the □ prompt appears.

- After exiting from a lesson or finishing it, you will see a summary of your scores for that lesson. Press any key to return to the title screen and main menu.

- At the end of the lesson, the program will review the questions which were answered incorrectly in the lesson.

- After the review, you will be asked if you wish to continue working on another lesson. If you answer with a "Y" for Yes, you will be prompted again to type a lesson number, and the new lesson will start. If you answer the previous question with an "N" for No, you will be allowed to exit the program by pulling the disk out of the disk drive, after the red light on the drive has gone off.

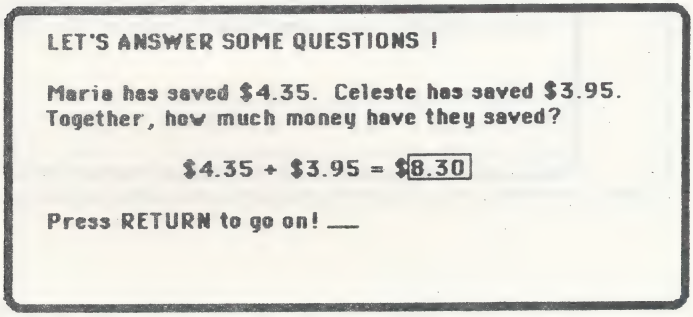
- For programs with the optional management system, your place in the lesson will be saved if you did not finish it. You may resume the lesson from that point the next time you use the program, or you may choose to work on another lesson at the next sitting.

Sample Items

(From Decimal Word Problems)

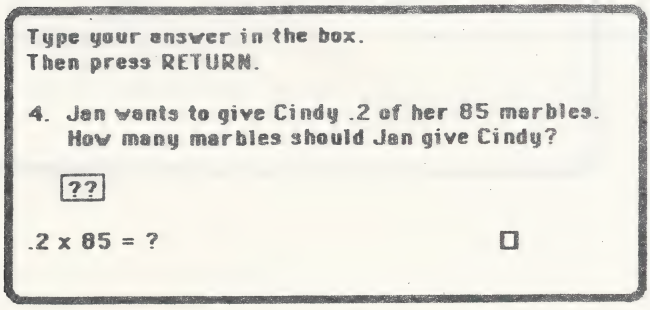
Sample 1 (Taken from Lesson 1, ADDITION & SUBTRACTION I)

Below is an example of how the screen appears at the beginning of this lesson. Since this is a tutorial lesson, the solution is worked out on the screen without the help of the student.

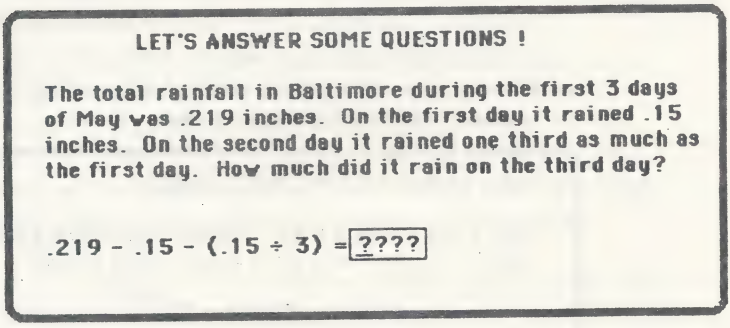

LET'S ANSWER SOME QUESTIONS !
Marie has saved $4.35. Celeste has saved $3.95.
Together, how much money have they saved?
$4.35 + $3.95 = $8.30
Press RETURN to go on!

Sample 2 (Taken from Lesson 4, MULTIPLICATION & DIVISION II)

Below is an example of how the screen appears after the student has entered an incorrect answer. If this is the first incorrect answer, the program will display a hint at the bottom of the screen and prompt the student to try again.

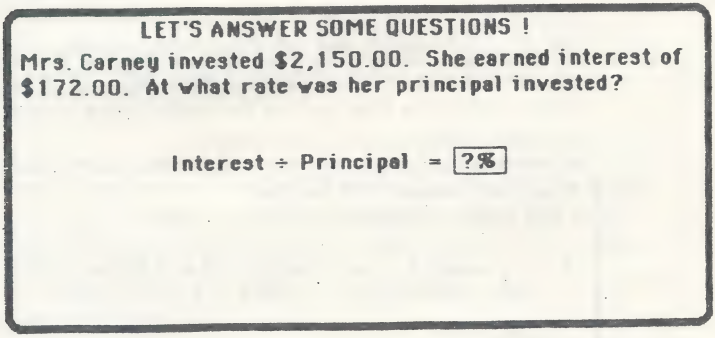

Type your answer in the box.
Then press RETURN.
4. Jan wants to give Cindy .2 of her 85 marbles.
How many marbles should Jan give Cindy?
??
.2 x 85 = ?

Sample 3 (Taken from Lesson 5, MULTIPLE OPERATIONS I)
Below is an example of how the screen appears before the student enters a response. Since this is a tutorial lesson, a partial solution is worked out on the screen for the student.

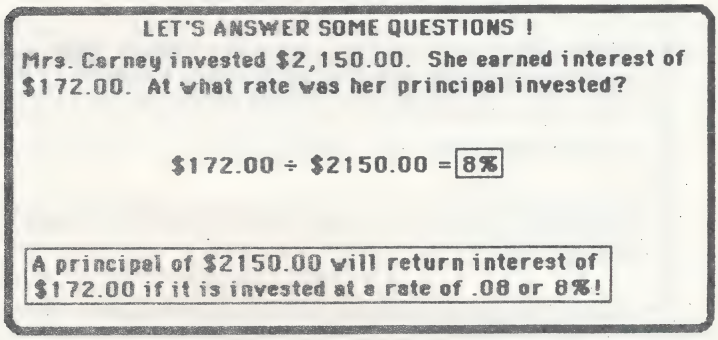

LET'S ANSWER SOME QUESTIONS !
The total rainfall in Baltimore during the first 3 days of May was .219 inches. On the first day it rained .15 inches. On the second day it rained one third as much as the first day. How much did it rain on the third day?
.219 - .15 - (.15 ÷ 3) = ????

Sample Items
(From Percent Word Problems)

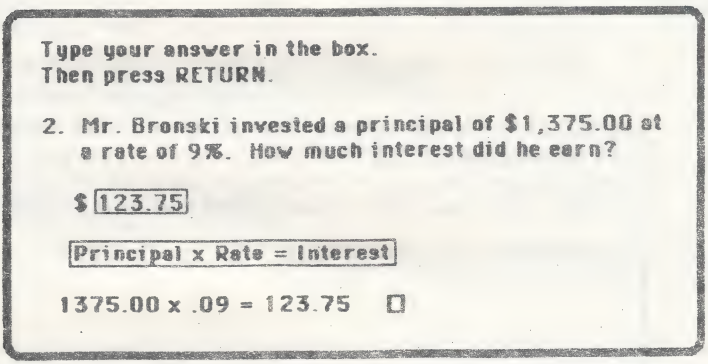
Sample 1: (Taken from Lesson 1, SINGLE OPERATIONS I)
Below is an example of how the first screen of this lesson appears before the student enters a response.


LET'S ANSWER SOME QUESTIONS !
Mrs. Carney invested $2,150.00. She earned interest of $172.00. At what rate was her principal invested?
Interest ÷ Principal = ?%

Sample 2: If the student enters an incorrect answer, the program will tell you to be careful in your calculations and allow you to try again. Once the correct answer is entered, the program highlights your answer and displays the steps that were necessary to reach that solution. You are then prompted to work on the next problem.


LET'S ANSWER SOME QUESTIONS !
Mrs. Carney invested $2,150.00. She earned interest of $172.00. At what rate was her principal invested?
$172.00 ÷ $2150.00 = 8%
A principal of $2150.00 will return interest of $172.00 if it is invested at a rate of .08 or 8%!

Sample 3: (Taken from Lesson 2, SINGLE OPERATIONS II) Below is an example of how the screen appears after the student enters a correct answer.


Type your answer in the box.
Then press RETURN.
2. Mr. Bronski invested a principal of $1,375.00 at a rate of 9%. How much interest did he earn?
$ 123.75
Principal x Rate = Interest
1375.00 x .09 = 123.75

Sample 4: (Taken from Lesson 3, MULTIPLE OPERATIONS I) Below is an example of how the first screen of this lesson appears before the student enters a response.

LET'S ANSWER SOME QUESTIONS!

$1000.00 is invested for 1 year at a rate of 15%. The amount earned was then invested at a rate of 10% for 1 year. How much was earned on the second investment?

($1000.00 x .15) x .1 = $?????

Multiply 1000 by .15. Multiply that number by .1. Type your answer in the box and press RETURN when you are done.

Sample 5: (Taken from Lesson 4, MULTIPLE OPERATIONS II) Below is an example of how the screen appears after the first incorrect answer is entered.

An investment of $2350.00 was made at a rate of 6%. After 1 year the amount earned was invested at a rate of 9%. How much was earned on the second investment?

$?????

(2350.00 x .06) x .09 = ? □

Suggestions for Use

Decimal and Percent Word Problems is designed for use by students in grades 6 through 8, but it can also be used effectively with gifted elementary school students and high school students needing remediation. Even though the lessons can be accessed in any order, it is suggested that students work on them sequentially, as they are listed in the **Program Contents** section of this manual. Lessons build on concepts introduced in earlier lessons. Also, the topics are introduced in the tutorial lessons and then are continued in the practice lessons. It is also suggested that the disk on decimals be used before introducing the disk on percentages, as these topics are normally presented in this order in the classroom.

It is recommended that students work on only one or two lessons per sitting in order to maintain interest and sustain concentration. Each lesson takes from 10 to 15 minutes to complete.

Before working on any of the lessons, it is suggested that students review the following topics:

Decimal Word Problems

- Word problems using decimals
- Word problems using money values
- Word problems using measurements (inches, feet, and miles)
- Using more than one calculation to solve a word problem dealing with decimals

Percent Word Problems

- Word problems using percentages
- Word problems using money values
- Converting decimal values into percentages, and vice versa
- Addition, Subtraction, Multiplication, and Division using numbers in the thousands' place
- Using more than one calculation to solve a word problem dealing with percentages

The following work sheets can help students to become familiar with the concepts presented in **Decimal and Percent Word Problems**:

Decimal Word Problems
Practice Worksheet

INSTRUCTIONS: Using the context of the following word problems, write a numerical equation that solves the problem, and fill in the spaces provided with this equation and the final answer. Use scratch paper to figure out the final answer.

Note: In place of the final answer, use a question mark when writing out the equation.

EXAMPLE: Amy babysat for 10 hours at $2.35 an hour. She babysat for 3 more hours at $2.55 an hour. How much more did she earn during the 10 hour job than the 3 hour job?

Equation: $(10 \times 2.35) - (3 \times 2.55) = ?$ Answer: $15.85

1. John sits 2.4 feet away from his computer. Lenny sits 1.3 feet away from his computer. How much closer is Lenny to his computer than John to his? **(10 points)**

Equation: _____ Answer: _____ft.

2. Wilbur wants to give Carol .6 of his 85 apples. How many apples should Wilbur give to Carol? **(5 points)**

   Equation: _____ Answer: _____

3. .12 of what is 36? = **(5 points)**

   Equation: _____ Answer: _____

4. If Maria cuts 12 rum cakes so that each slice is .025 of a cake, how many slices of cake will she have? **(10 points)**

   Equation: _____ Answer: _____

5. Jeanne lives 4.5 miles from her grandmother. She rides a bus for .86 of the distance. How many miles does Jeanne ride the bus? **(10 points)**

Equation: _____ Answer: _____

6. Patty gave Pip $15.00. Pip bought 13 bandanas that were $ .73 each. How much money did Pip have left? **(10 points)**

Equation: _____ Answer: $_____

7. Mr. Shultz needs a piece of plasterboard 36.24 inches long and one 48.62 inches long. If the pieces of plasterboard cost $ .32 per inch, what is the total cost of Mr. Shultz's piecees of plasterboard? **(10 points)**

Equation: _____ Answer: $_____

8. The total snowfall in Seattle during the first 3 days of December was 4.6 inches. On the first day, it snowed 2.5 inches. On the second day, it snowed one half as much as it did the first day. How much did it snow on the third day? **(15 points)**

Equation: _____ Answer: _____inches

BONUS QUESTION:

Brenda needed to decorate her Christmas tree, so she bought a red garland 204.23 inches long and a gold garland 363.08 inches long. If the pieces of garland cost $ .15 and $ .25 per foot respectively, what is the total cost of Brenda's garlands? **(25 points)**

Equation: _____ Answer: $_____

Number of Questions Correct _____

Points Earned _____

Percent Word Problems
Conversion of Percents and Decimal Values
Worksheet

Instructions: Convert the following values into decimal or percentage values in the spaces provided. 10 points will be awarded for each correct answer.

PERCENTAGES	DECIMAL VALUES
1) 45% =	_____
2) _____	1
3) 125% =	_____
4) _____	.008
5) .25% =	_____

6) _____ .120

7) 4.5% = _____

8) _____ .64

9) 1.0% _____

10) _____ .005

Number of Questions Correct _____

Points Earned _____

Percent Word Problems
Practice Worksheet

INSTRUCTIONS: Using the context of the following word problems, write a numerical equation that solves the problem, and fill in the spaces provided with this equation and the final answer. Use scratch paper to figure out the final answer.

Note: In place of the final answer, use a question mark when writing out the equation.

EXAMPLE: $2,000.00 is invested for 2 years at a rate of 23%. The amount earned was then invested at a rate of 25% for 1 year. How much was earned on the second investment?

Equation: (2000 x .23) x .25 = ? **Answer:** $115.00

1. Ms. Madeleine invested a principal of $1,545.00 at an annual rate of 12%. How much interest did she earn in one year? **(10 points)**

Equation: _____ Answer: $_____

2. A new skiing outfit which costs $1,200.00 was discounted to $950.00 at the end of the season. What was the discount rate? **(10 points)**

Equation: _____ Answer: _____%

3. $2,500 is invested for 1 year at a rate of 12%. After a year, the total sum (the original investment plus one year's worth of interest) was then invested at a rate of 14% for a second year. How much interest was earned on the second investment? **(15 points)**

Equation: _____ Answer: $_____

4. Lindsay decided to open a Scottish imports store, and he needed some books to help him start up his business. He bought three books from the bookstore that looked helpful and interesting. Each book cost a different price: $12.95, $15.99, and $8.49. Only two of the books were on sale at 10% off: the one for $12.95 and the book for $8.49. What did Lindsay pay for all three of the books after the discounts were calculated? **(20 points)**

Equation: _____ **Answer:** $_____

BONUS QUESTION: (45 points)

Anne wakes up at 6:00 A.M. and arrives at her workplace at 8:00 A.M. She works from 8:00 A.M. until 5:00 P.M., and she spends a total of 1 hour of her day driving to and from work. When she gets home, she eats dinner for one hour and goes to bed at 11:00P.M.

Question 1: How many hours does Anne spend awake?
Hint: One way to figure out the answer is to use the following conversion: 11:00 P.M. = 23 hours.**(20 points)**

Equation: _____ Answer: _____ hours

Question 2: What percentage of Anne's waking hours does she spend at work? Convert your answer from a decimal value to a percent value. **(25 points)**

Equation: _____ Answer: _____ %

Number of Questions Correct _____

Points Earned _____

Supplemental Exercises
Answer Key

DECIMAL WORD PROBLEMS

1) Equation: 2.4 - 1.3 = ? Answer: 1.1 ft.
2) Equation: .6 x 85 = ? Answer: 51 apples
3) Equation: 36 ÷ .12 = ? Answer: 300
4) Equation: 12 ÷ .025 = ? Answer: 480 slices
5) Equation: 4.5 x .86 = ? Answer: 3.87 miles
6) Equation: $15.00 - (13 x $ .73) = ? Answer: $5.51
7) Equation: (36.24 + 48.62) x $ .32 = ? Answer: $27.16
8) Equation: 4.6 - 2.5 - (2.5 ÷ 2) = ? Answer: .85 inches

Bonus Question

Equation: [(204.23 ÷ 12) X .15] + (363.08 ÷ 12) X .25] = ?

Answer: $10.12

PERCENT WORD PROBLEMS

CONVERSION OF PERCENTS AND DECIMAL VALUES

1) .45
2) 100%
3) 1.25
4) .8%
5) .0025
6) 12%
7) .045
8) 64%
9) .01
10) .5%

PRACTICE WORKSHEET

1) Equation: 1,545 x .12 = ? Answer: $185.40

2) Equation: 100-(950 ÷ 1,200) = ? Answer: 21% (20.83%)

3) Equation: (2,500 x .12) x .14 = ? Answer: $42.00

4) Equation: (15.99 + 12.95 + 8.49) - .1(12.95 + 8.49) = ? Answer: $35.29

BONUS QUESTION

Equation 1: 2300 - 600 = ??.?? or (12-6) +11= ?? Answer: 17.00

Equation 2: 9 ÷ 17 = ??% Answer: 53%

Management System Instructions

Note: Unless you specified with your order that you wanted a management system, your program will not include the management system described below. If you do have a management system, the program will ask: "Is this the first time you have used this disk?" after you enter your name. If you do not have a management system, this question will not appear.

If you would like to add a management system to your disks, return them to Intellectual Software. The charge for adding management is $10.00 per disk.

In order for the management system to work properly, the disks must not be write-protected. Do not put a write-protect tab on the disk.

Student Use

Students interact with the management system only when they enter names which do not appear on the file, or when they restart the program after exiting from a lesson without finishing it.

* Remind students to enter their names exactly the same way each time they use the program. If a student enters her name as KATE one day and as KATHARINE the next, the management system will list her as two different people.

* When a student resumes the program after using ESCAPE to exit from a lesson, the unfinished lesson module will be highlighted on the menu. The program will suggest that the student work on that lesson. If the student selects the highlighted module, the lesson will resume where the student left off.

* Any other module may be selected instead, but then the system will not continue to hold the student's place in the unfinished module. The student would have to restart that module from the beginning if he or she returned to it at another time.

Teacher Use

Teachers must load the management system in order to see the students' records. To load the management system, follow the directions below.

At any point before or after a lesson module:

Apple II and II+ Users: Press down the CONTROL key. While continuing to hold down the CONTROL key, press down both the SHIFT and the M keys. Release the keys when LOADING MANAGEMENT SYSTEM appears on the screen.

Apple IIe and IIc Users: Press down the CONTROL key. While continuing to hold down the CONTROL key, press down the right bracket ( ]) key. Release the keys when LOADING MANAGEMENT SYSTEM appears on the screen.

When the red disk drive light goes off, the following management system menu will be displayed:

MANAGEMENT SYSTEM

-- STUDENT RECORDS --

YOU MAY CHANGE DISKS NOW

(1) ALL STUDENT RECORDS TO SCREEN
(SHIFT - 1 FOR HARD COPY)
(2) INDIVIDUAL RECORDS TO SCREEN
(SHIFT - 2 FOR HARD COPY)
(3) ERASE ALL STUDENT RECORDS
(4) MODIFY ALLOWED RESPONSE TIME
(5) RETURN TO TUTOR

YOU MAY CHANGE DISKS NOW means that you may look at the records in the management system of any other Intellectual Software tutorial disk by simply removing the disk currently in the drive and then inserting the disk you wish to examine. There is no need to restart the program on the second disk in order to get into its management system.

Type the number of the desired option:

(1) ALL STUDENT RECORDS TO SCREEN
(SHIFT-1 FOR HARD COPY)

This option allows you to see the score tables for all the students in the file. Proceed from one screen to the next by pressing RETURN when prompted. Individual score tables are displayed in the order in which the students entered their names in the system.

To print out all the records, depress the 1 key while holding down SHIFT. The program will ask: "Is the printer on and connected properly? (Y/N)." Make sure that the printer is on before pressing Y. Press N to return to the management system menu.

(2) INDIVIDUAL RECORDS TO SCREEN
(SHIFT-2 FOR HARD COPY)

This option allows you to see the score table for an individual student. You will see a numbered list of the students in the file. Type the number of the student whose record you wish to see and then press RETURN.

(3) ERASE ALL STUDENT RECORDS

This option clears all names and scores from the management system. The management system can hold only ten students' records. If an eleventh student tries to enter his or her name, a DISK FULL message will appear. You must then record or print out the current records, if desired, and then erase them from the disk to clear the management system. Typing 3 will display CONFIRM ERASE ALL STUDENT RECORDS? (Y/N). Type N for No to change your mind and select a different option. Type Y to erase all records.

(4) MODIFY ALLOWED RESPONSE TIME

This option allows teachers to change the response time allowed in the lessons. Some programs count a response as incorrect if it is not made within a predetermined time; other programs are untimed. Here, the teacher has three choices: type -1 to use the response time already specified in the lesson, type 0 for untimed responses, or type a number from 1 to 250 to specify a response time in seconds.

(5) RETURN TO TUTOR

This option loads the tutorial program.

SUPPORT

If you have any questions or problems, call Intellectual Software at 1-800-232-2224 (in Connecticut, Hawaii, Alaska, and Canada, call 203-335-0908). Defective disks will be replaced free of charge within 90 days of invoice date. Disks damaged after 90 days may be replaced at $10.00 per disk. Mail the damaged disk to Intellectual Software at 562 Boston Avenue, Bridgeport, CT 06610, for a prompt replacement.

Backup disks are available for $10.00 per disk. Customers are limited to one backup disk for each disk purchased. Backup disks are for archival purposes only.

Never expose any computer software to excessive heat or cold. Do not leave your software near a strong magnetic field such as might be produced by an electric appliance, stereo, or speaker magnet. Always place your software in its sleeve when you are not using it. This will protect it from dust and fingerprints. Finally, never touch the exposed parts of the disk which are visible through the holes in the disk cover.

INTELLECTUAL SOFTWARE

Queue, 5 Chapel Hill Drive, Fairfield, CT 06432

1-800-232-2224 · 203-335-0908